THE UNIVERSITY OF ALBERTA

M.V.A. FINAL VISUAL PRESENTATION

by

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A THESIS

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The undersigned certify that they have read and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled:

Facilitating CAD Designer-Client Interaction
in the Housing Process

submitted by.....Peter Laing Leith Jarvis.....
in partial fulfillment of the requirements for the degree of Master of Visual Arts.

RELEASE FORM

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I hereby release the following works for incorporation into the University Collections, University of Alberta, as part of the Master of Visual Arts Thesis Collection:

	TITLE	DATE	MEDIUM	SIZE
1	Video tape "M.V.A. Thesis"	April '86		"3/4 inch"
1	set of Calcomp Plots	April '86	Mylar, Vellum	"C"
1	menu "KEYFILE.PJ.THESIS"	April '86	Plotting Paper	"C"

Facilitating CAD Designer-Client Interaction in The Housing Process

This thesis focuses on providing a means for non-designers to participate in the design of their own homes. The housing design process has been simplified by using software which was created on a Computer Aided Design (CAD) system. It enables non-designers to participate in resolviing house design problems by working with a professional at a CAD workstation. Together they create an electronic model in the CAD database representing a full-scale three-dimensional house. A house can easily be designed with the software components - volumetric models of space, rooms, furniture, doors, windows, and other features. Modifications to the design can be made at any time. The electronic 3-D model in the CAD system functions as a common language between the non-designer/ client and the professional.

The research for this work developed from my interest in the process of housing people in industrialized countries. Currently, four notable movements affecting the housing process are: the inevitable industrialization of the housing industry (Sullivan, 1980); the growth of user participation in the design process (Habraken,1971); the impact of CAD technology on the fields of architecture, industrial and building design (Maver,1973; Mitchell, 1977); and the changing roles of designers influenced by these movements (Watt,1984) - including the emergence of designers of industrially produced buildings (Safdie,1970).

The user participation movement has greatly influenced the direction of my work. User participation is a world-wide movement represented by professionals in all fields of design. It began as a premise for the Foundation for Architect's Research founded by N.J. Habraken in Holland over twenty years ago. User participation research promotes the development of both theories and practical projects which improve and increase non-professional involvement with the housing process. Examples of projects in the built environment include communities ('Brukarplaning', Sweden), housing complexes (PSSHAK,England; Spiral House,Holland), and individual houses (CHAP,Canada). As well, scaled modelling kits have been designed to be used specifically by non-professionals in order to make design decisions related to housing (Bentz,Gibson, Hardie,Lawrence). One of the ideals of the user participation movement is to promote a holistic approach to the improvement of society, individual freedom, and the built environment. Creating a means, with CAD software, by which clients and designers are able to interact with greater ease in the design process is in line with that ideal and an objective of this thesis.

The CAD 3-D volumetric models I have developed facilitate visualization, problem solving and decision making about forms and spaces related to house design. These serve as a design tool for activating the inherent sense of house design which everyone possesses and they provide a means desired by many to participate in the housing design process. This computerized housing design approach encourages user dialogue and user decision making. Conversation between the client and the designer enhances the design process and their interaction with the CAD system. Although the hardware at the workstation is intended to be operated by a skilled designer-operator, a means has been created which allows those unfamiliar with computers to move volumes, spaces, rooms, furniture and a humanoid model; thus actively participating in decision making.

Some approaches to house design consist of computer programs which lead through a routine to arrive at decisions of floorplans or an ideal house (Cupid, Partial). My work is concerned with improving the capability of a CAD system (Computervision's CDS 4000 using CADDS4X) by extending it to house design. This approach is also an attempt to decrease the alienation commonly felt towards the ever-increasing industrialization of the building industry.

The housing industry's flirtation with computerization is not likely to change its nature overnight. Many forces are continually affecting significant changes in the building industry. Computer-ization in the design and manufacture of houses will permit the custom designed house to be produced economically. However, investment in a system, the costs of training employees and the other expenses such as re-tooling prevent all but the largest companies from financing the adaptation of CAD/CAM. In all likelihood the larger companies will account for the greatest percent of house production in the future. The intent of my thesis has been to facilitate user involvement in this highly sophisticated, technologically advanced housing process.

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PRESENTATION SLIDES

(Computervision CADDS4X Mechanical Design Software
Developed for Housing Design
Displayed on a CV Instaview 'C' Terminal)

1. Text: Title block, Computervision Font 7 (draw mode)
2. Text: Name Plate, Wireframe Trial Font 1, top view (model mode)

Shaded Pictures - Volumetric House Model Forms

3-4 Modular Generic House Model Forms
5. Single Storey
6. One and a half Storey
7. Split Level
8. Bi-Level
9. Bungalow with partial roof
10. Bungalow with Roof
11-13. Bungalow in Perspective View
14. Bungalow in Perspective with cutaway view
15. Bungalow in Isometric with Hidden Line Outline
16. Bungalow in Isometric with cutaway view

Wireframe/Edge-Vertex Model Forms for House Design

17. Dimensioned Floorplan (Model Mode, Top View)
18. Dimensioned Floorplan - Isometric View
19. Dimensioned Floorplan - Isometric View + Windows
20. Dimensioned Floorplan - Isometric View + Windows, Doors, & Walls

Facility Library For Service Spaces

21. Service Facility Library in Isometric View + Drawform
22. Text: Title block: Service
23. Text: Schedule: Service

Wireframe/Surface Models - Volumetric Appliance Forms

24. Refrigerators/Freezer
25. Ranges/Ovens
26. Washer/Dryers/Laundry Tub
27. Cabinets/Counter/Stools/Lazy Susan
28. Sinks
29. Bathtub/W.C./Shower
30. Wireframe Presentation Picture
31. Shaded Presentation Picture
32. Mixed Wireframe & Shaded Presentation Picture

Facility Library For Sleeping Spaces

33. Sleeping Facility Library in Isometric View + Drawform
34. Text: Title block: Sleeping
35. Text: Schedule: Sleeping

Wireframe/Surface Models - Volumetric Furniture Forms

36. Chairs/Adult's Beds
37. Bunk Beds/Crib
38. Closet/Chest/Storage volume
39. Dressers
40. Wireframe Presentation Picture
41. Shaded Presentation Picture
42. Mixed Wireframe & Shaded Presentation Picture

Facility Library For Living Spaces

43. Living Facility Library in Isometric View + Drawform
44. Text: Title block: Living
45. Text: Schedule: Living

Wireframe/Surface Models - Volumetric Furniture Forms

46. Round Dining Tables
47. Rectangular Dining Tables
48. Large/Small Desk + Chair
49. Bookshelf/China Cabinet/Chair
50. Three Armchairs/Piano + Bench
51. Large/Small Sofa + End Tables/Coffee Table/TVs
52. Wireframe Presentation Picture
53. Shaded Presentation Picture
54. Mixed Wireframe & Shaded Presentation Picture

Presentation Shaded Pictures

55-59. Bathroom Layout in Perspective
60. Moduleman - Isometric Shaded Picture
61. Moduleman - Front View
62. Moduleman & Son - Front View
63. Kitchen Layout - Isometric
64. Kitchen Layout with Moduleman & Son
65. Spatial Relationship Demonstration
66-69. Kitchen in Perspective with Moduleman & Son
70. Dimensioned Wireframe House Model including Floorplan, Windows, Doors, Walls and Roof